PLASTICS

A Periodical Devoted to the Manufacture and Use of Composition Products

MARCH, 1927

Durez molds rapidly into the most intricate and delicate forms. It hardens quickly. Its unusual strength permits its use in thin sections. Novelties and parts made of wood, hard rubber, ivory, glass or metals, can frequently be molded of Durez more rapidly and at less cost. There appears to be no limit to the variety of its applications.

Durez, as it comes from the mold, has a beautiful, fine, permanently lustrous finish. This saves finishing costs and brings new qualities of beauty to the finished product that build preference and prestige. Its physical strength is extraordinary. It is an electric non-conductor and resists heat. Abrasion, oil, water and most acids have no effect on Durez.

The Durez laboratory will investigate, without obligation, manufacturing problems to which this unusual plastic is applicable.

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GENERAL PLASTICS INCORPORATED,
NORTH TONAWANDA, N. Y.
CHICAGO, NEW YORK, SAN FRANCISCO

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ERITH

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"AMERITH" A name coined by The Celluloid Company to signify "an article of merit", was adopted as a trade-mark. Applied to sheets, rods and tubes, this name now stands for the best that is obtainable in pyroxylin plastic materials. Backed by fifty-six years of experience, "AMERITH", is truly "the master plastic".

"SUPER-PEARL-AMERITH" Beautiful and lustrous, the most attractive pearl on the market. Composited on delicate pastel shades, it is demanded by those who want the best.

"SAMSON CELLULOID" Transparent film in sheets or in continuous lengths, 21 or 43 inches wide, is ideal for purposes requiring clearness, stability and strength.

"PROTECTOID" A slow burning, practically non-inflammable, clear transparent film is supplied in sheets and continuous lengths.

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ALTHOUGH PLASTICS is only in its third year, and no particular effort has been made to introduce the magazine to foreign countries, a very surprising state of affairs has developed.

Almost daily inquiries and subscriptions come to our office from far-away lands, many of them from non-English speaking countries. Somehow, the fact that at last there has been published a magazine bearing interesting data upon an industry of paramount importance and world-wide ramifications, is becoming known and appreciated.

We number among our subscribers such representative foreign concerns as The British Thomson-Houston Co., British Xylonite Co., Damard Lacquer Co., Alfred Harris & Co., Rolls-Royce, Ltd., and numerous others, all of England.

In Germany our subscribers include most of the large producers of celluloid and casein materials, such as the Internationale Galalith Ges. Hoff & Co., Dr. Max Landecker; H. Prehn; Rheinische Gummi und Celluloid Fabrik; G. Siempelkamp & Co., and many others.

In France: the Societe Industrielle des Matieres Plastiques and concerns of similar prestige; while Italy, Japan and So. America are likewise represented.

The constant growth of PLASTICS is accounted for by the increasing number of subscribers, and also to a very marked degree by the constantly growing list of advertisers.

We trust that we shall continue to merit this success by increased service to both subscribers and advertisers.

The Publishers.

PLASTICS

A periodical devoted to the manufacture and use of plastic and composition products

Vol. 3 March, 1927 No. 3

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Publication Office: Washington, N. J.

Offices: 471 4th Ave., New York. Telephone Ashland 0568

SYLVAN HOFFMAN, Publisher ALAN COHEN, Adv. Director

E. D. Sheriffs, Chicago Representative
80 E. Jackson Blvd.

Issued Monthly
35 cents a copy

Subscription Price
U. S. $3.00, Foreign $4.00 Per Year

PLASTICS

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Vol. 3 MARCH, 1927 No. 3

Fabricating Pyroxylin Articles From Sheets

Advantages of electrically heated dies over the older hot-water methods explained

By A. Jaeckel

From Gummi-Zeitung, 1926, **40**, 2175-77

WHEN the commercial forming of pyroxylin plastic articles began to become more common, as it did back in the 90ties of the past century, all of the manufacturers that attempted to make articles drawn from the plastic sheets made use of the well known properties of this material of softening under hot water, and with few exceptions all deep drawn pyroxylin plastic articles were made in this way.

Some manufacturers, throwing caution to the winds, attempted to draw such material in dies and forms heated by gas, and many a serious conflagration had its start in this foolhardy endeavor. However, only a comparatively small number of articles, usually quite flat, can be made by dry drawing, and it has become the standard practice to draw such articles under water.

Fig. 1. Metallic or wooden forms used for shaping pyroxylin plastic boxes.

Hot-water Process

The process usually employed is quite simple. Pyroxylin plastic sheets are cut into the required size and are placed in a cold form, both the form and the sheet then being put into the hot-water press. For simple objects this can have the form shown in figures 1 and 2. The press is only closed sufficiently tight to just hold the sheet in place. The entire outfit is then immersed in hot water and as soon as the plastic sheet is seen to become soft a certain amount of pressure is applied by means of the screw. This forces the upper die, called the patrix, into the lower die, called matrix, and the sheet is slowly drawn into the die. It requires a very nice judgement to apply the pressure gradually enough to prevent marking and even possible rends in the sheet, and a certain amount of experience is quite necessary. The heating is usually continued for a few minutes longer and the screw drawn down further, until the object has been completely drawn. The press and its contents is then put into cold water to set the article.

Deeper boxes and similar shaped objects are usually made in a die the bottom of which is removable, so that the finished article can be more readily withdrawn. In order to make better time, each workman usually takes care of a number, generally about four, of these presses and molds, so that there is little loss in time. While it

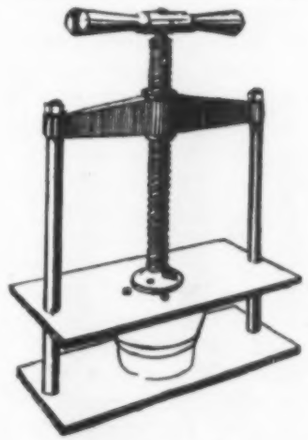


Fig. 2. Type of hand-operated press used in conjunction with forms as shown in Fig. 1 for shaping pyroxylin sheets.

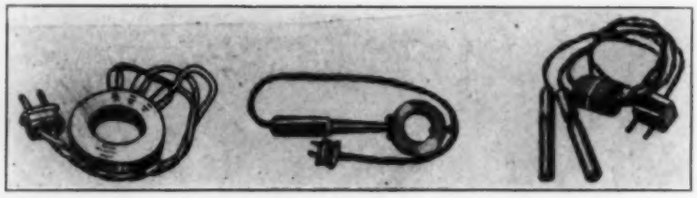


Fig. 5 and 6—Electrical Heaters

must be admitted that this way of operating is very simple and effective, it nevertheless has one great objection, and that is that polished sheets can not be worked in this way as the polish is destroyed by the heating. As this requires a further operation, a method which obviates the use of water is very desirable.

In the early days of the pyroxylin plastic industry, electrical apparatus was not sufficiently perfected to allow of its application to heating molds and dies, and the accurate control of temperatures was almost impossible. However, much progress has been made in this field, and now electrically heated and controlled pyroxylin plastic drawing dies can be obtained. This method make the operations much cleaner and the results are also incompar-

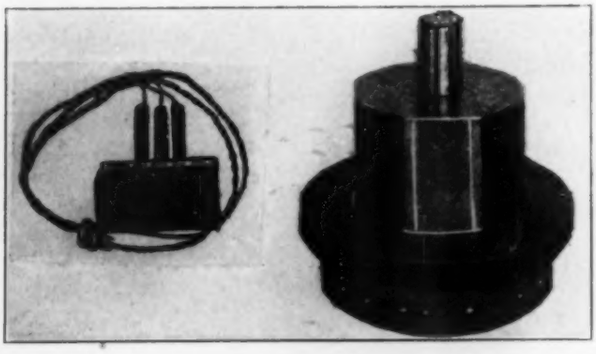


Fig. 7 and 8—Other madifications of electrically heated forms. The smaller one is a heating sleeve for use over ordinary forms or molds.

Dies suitable for electric heating are illustrated in figures 3 (for drawing round boxes), and in figures 4, (a die suitable for making borders and the like). The heating elements are separate and are placed around the dies. Means for adjusting the heat, usually four stages, are provided, so that when the heating element is once at the proper temperature it can be maintained in that condition with a minimum consumption of current.

The operation is very simple. The sheets of pyroxylin plastic are placed in the die, which has first been brought to the proper temperature, and the die is then slowly closed. There is no necessity for cooling as the drawing is accomplished at just the right degree of heat, and the objects can be removed as soon as finished, and only very large and deep boxes require any cooling in water. Suitable lugs on the heating elements lead to the required number of turns of the heating-wire imbedded in them, and also make it very easy to connect and disconnect the rings.

The heating rings can be applied to either the patrix or matrix or both, an heating element suitable for this purpose being shown as a sleeve-form in figure 8. Other heating elements are shown in figs. 5 and 6, while 7 shows a typical die used for finishing the edges of the drawn objects.

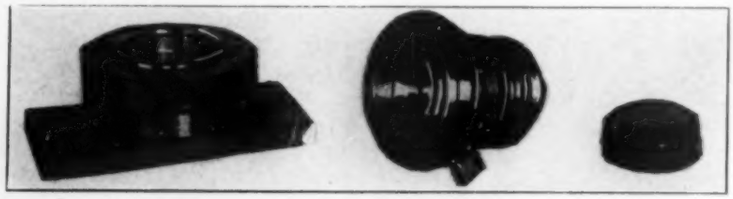


Fig. 3—Electrically Heated Drawing Die

Unquestionably electrically heated dies are much to be preferred, and although they may cost more at the start, the time element saved more than outweighs this.

One thing which must be taken into consideration is the proper electrical insulation of these dies, as otherwise there is danger from fire. Care should also be taken not to leave any pyroxylin in the dies over night in the helief that the current is turned off.

The greatest advantage lies in the fact that for some purpose the articles have a sufficient polish to be marketable directly.

In a forthcoming issue of **Plastics** the working of pyroxylin plastic tubes will be taken up.

Fig. 4—Electrically heated formes such as these save much time and can be controlled accurately for temperature.

Acrolite--another New Member of the Phenol Resin Family

Glycerol and phenol condensed in presence of sulfuric acid to form highly lustrous product

By James McIntosh
Diamond State Fibre Co., Bridgeport, Pa.

THE January, 1927 issue of **Industrial and Engineering Chemistry**, p. 111, contains a short article on the manufacture of a new synthetic resin produced by the condensation of phonel and glycerol, and to which the name of **Acrolite** has been given.

The essential information contained in the article, aside from historical considerations, is that it has been found that the condensation of phenol and glycerol (glycerine) can be easil controlled. The author states that:

Condensation

On a commercial scale it is carried out in a pressure-jacket autoclave, provided with a mechanical stirrer and so equipped that it can be steam-distilled under vacuum. In the laboratory the reaction can be studied in a glass flask or in a pressure bomb. The following is a typical illustration:

Place 1000 grams C. P. crystal phenol, 700 grams C. P. glycerol (sp. gr. 1.25), and 10 cc. sulfuric acid (sp. gr. 1.84) in a round-bottom, short-neck, 2-liter flask. Place a thermometer through the cork into the solution and heat the flask over a direct flame, holding the temperature between 160° and 190° C. As fast as the water of reaction is formed it is fractionated off through a 2-bulb stillhead filled with glass beads, connected with a water-cooled condenser. During the reaction some phenol is carried over. From time to time separate the phenol from the water in a separating funnel and return to the original flask. When approximately 350 grams have been distilled, allow the reaction flask to cool slightly and neutralize any acid with barium carbonate, calcium carbonate, or calcium oxide. Calcium or barium compounds are preferable because they give insoluble sulfates, which do not impair the dielectrical properties of the resin.

In the acid state the resin is reddish brown; in the alkaline state it is a deep purple. The color change is very sharp and pronounced. When not subjected to polymerization temperature the neutralized resin is permanently soluble and fusible. When cut with alcohol it makes an excellent insulating varnish, the dry film from which gives a brilliant luster and is flexible.

In carrying out this reaction it is helpful to use an excess of phenol; otherwise the resin has a tendency to be rubbery or slightly insoluble. The use of an excess of phenol is commercially feasible as it can be recovered and used again. On the other hand, a slight excess of glycerol impairs the hardness and is detrimental to dielectric and other properties of the resin.

The foregoing reaction is a progressive condensation, and can be stopped at different stages. The yield will vary somewhat, depending upon how far the reaction has been carried. At the beginning of the reaction there is a watery white limpid solution, which gradually changes to pink and finally to a deep, dark, almost black resin solid at room temperature. If the acid catalyst is not neutralized, heat alone will easily cause the condensation to carry over to the insoluble, infusible state.

This new synthetic resin can be heated over a direct flame to 325° C. or even higher after the acid has been neutralized. At this high temperature the resin will pour with water fluidity and on cooling it will set hard, with a brilliant luster, easily soluble in alcohol, acetone, and other solvents. Furthermore, it can be made potentially reactive by adding an aldehyde or other derivative of the methylene group.

In practice it is advisable to add from 4 to 12 per cent of a hardening agent, preferably formaldehyde, paraformaldehyde, or hexamethylenetetramine, to the neutralized soluble, fusible resin. These hardening agents speed the curing period; in other words, they enable the resin to change quickly from the soluble, fusible to the insoluble, infusible state. The resin in the insoluble and infusible stage will char and not soften when subjected to excessive heat.

Molding powders can be made from this glycerol phenolic resin by the dry or wet process. In the wet process the resin is cut with alcohol and the wood flour, color, and harding agents are kneaded in. In the dry process the resin is broker down and rubber compounding rolls are used to work the wood

(*Continued on page 125*)

The Manufacture of Casein Solids

II. Extrusion of rods, and the formation of sheets described in minute detail

By Heinrich Prehn

Consulting Engineer; German Correspondent of Plastics

IN the January installment of the present series of articles, the mixing of the ground casein was the last point under discussion. In this connection attention is called to still another method employed for the mixing of casein with coloring matters and fillers. This method is necessary when working on so-called Calendering presses, and while not universally applicable, is occasionally used.

This method of mixing consists in gelatinizing the casein in large heated mixing machines with the addition of considerable water and other chemicals. The pasty mass thus obtained is then homogenized and evaporated upon heated calendering rolls and finally the soft sheets obtained are cut into strips. These are thereupon further worked up into sheets. This stage of the manufacture will be taken up in detail later, after the next chapter which deals with the extrusion of rods and tubes.

Extrusion

This brings us to the important stage of the manufacture of Casein Solids, and one to which too much attention can not be given as the success of the final products depends to a large degree upon the amount of care and skill given to this stage of the process. The machinery employed for these operations is commonly spoken of as extrusion presses, rod-presses, tube-presses or spindle presses.

As to the construction of these machines, the types used by the various manufacturers differ considerably from each other, but in general these follow the well-established lines developed for the production of rubber tubing, such as are employed in the caoutchouc industry. Such a machine is illustrated in Figure 6 (of the entire series). (See page 107)

IN the January issue of PLASTICS *there began a series of articles on the details of the manufacture of Casein Solids, in which the grinding of the casein was discussed. In the present continuation of the series, the forming of the casein solids rods, tubes and sheets will be taken up, especial attention being given to the machinery and appliances required, and their proper adjustment and upkeep. While general articles on the Casein Solids industry have appeared in* PLASTICS *and other journals, we believe that this is the first time that the manufacturing details have ever been disclosed in such a wealth of detail. The writer, Mr. Heinrich Prehn, is an acknowledged authority in the field of plastic materials in Europe, and has given* PLASTICS *the exclusive rights to this series of articles. A further installment will appear in the April issue.*

Operating Details

Essentially these spindle or extrusion presses consist of a cast-iron cylinder, made in either two or three parts, and capable of being both heated and cooled. It has an opening on the side for feeding the material, and either a single or double propelling screw. This is usually made of steel and is generally about 100 mm. in diameter (about 4 inches). The axial pressure of this screw is taken up by a strong ballbearing located at the rear of the cylinder in which the screw rotates. The forward part of the machine, from which the material is to issue, must also be made of steel, and likewise be capable of being heated or chilled, as the case may be. This part of the extrusion press is also provided with a mouthpiece or nozzle, which may be either long or short depending upon the color and type of casein solid which is to be manufactured. The necessary piping and valves for the cooling and heating system of these extrusion presses is usually furnished by the manufacturer of the machines. Without exception these machines are located upon a cast-iron base or block, as construction must be rigid. The extrusion is actuated either by a train of gears or by a worm-gear. Nothing but the best grade of iron or steel must be used for the construction of these machines as they are subjected to a great deal of strain in use. The forward part of the cylinder must be so constructed that it may readily be detached for cleaning. The usual arrangement is to have a rotatable support upon the base of the machine so that it will hold up the detachable front part of the machine when the same is swung aside.

In addition to the extrusion press proper, a table with a moving top is provided to carry along the extruded rod as it issues from the nozzle of the press. This table is usually about 6½ feet ong, and the belt which conveys the rod is driven from the same shaft, or from a pulley attached to the extrus-

ion press, so that the speed of issuing and forward motion of the conveying belt will be properly coordinated.

The quality of the casein solids produced, and, incidentally, the prosperity of the enterprise, depends in a large way upon the quality of the extrusion presses, as more delay and "grief" can be caused by improper adjustment in this phase than at almost any other point in the long manufacturing process.

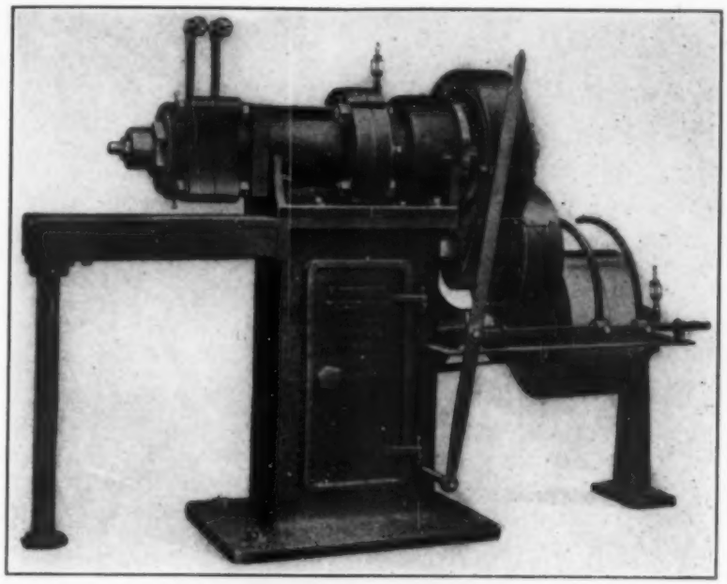


Fig. 6—Rod and tube press for extruding casein plastics

Although the lay reader may arrive at the conclusion that there does not appear to be very much difference between the spindle presses offered by the different manufacturers, it should be pointed out that some of these while eminently suitable for the manufacture of rubber tubing or similar products are entirely unsuitable for the production of perfect casein solids. It is a fact that with some of the machines offered for the purpose, casein solids simply can not be made right. For this reason it is of prime importance when equipping a plant for the production of casein solids to consult someone who has had thorough experience in this field, and who is familiar not only with the installation of one or two casein solids plants, but has an intimate knowedge of the diverse systems used here and abroad.

The spindle presses are operated as follows: The thoroughly ground and well-mixed raw casein and coloring matter, etc., is put into the feed-hole of the press. If, on account of mixing damp materials with the casein, small lumps should be present in the ground and mixed material, it is advisable to pass the same through a fine metal wire screen to remove these small lumps as they will be sure to cause trouble later on. On a large scale this sifting must be carried on mechanically. The internal screw of the press gradually moves the powdered material forward toward the discharge opening. As the pitch of the screw gradually diminished toward the discharge end, the material is gradually subjected to a constantly increasing pressure and as it is at the same time being heated by the steam-jacket surrounding the machine (or other means of heating) the material will be homogenized and at the same time consolidated into either a rod or tube which issues from the conical discharge orifice or nozzle of the extrusion press, depending upon the type of nozzle in use.

At this point several things should be carefully noted, as success of failure depend to a great degree upon these details. The amount of material fed to the machine should be very carefuly adjusted to the speed of the formation of the rod, as an excess of material must be avoided as it places an undue strain upon the machinery. The powdered material should be fed in the exact proportion to the material leaving the machine as a rod or tube. The operators must be carefully schooled in feeding the press, or, better still, an automatic feeding arrangement should be provided.

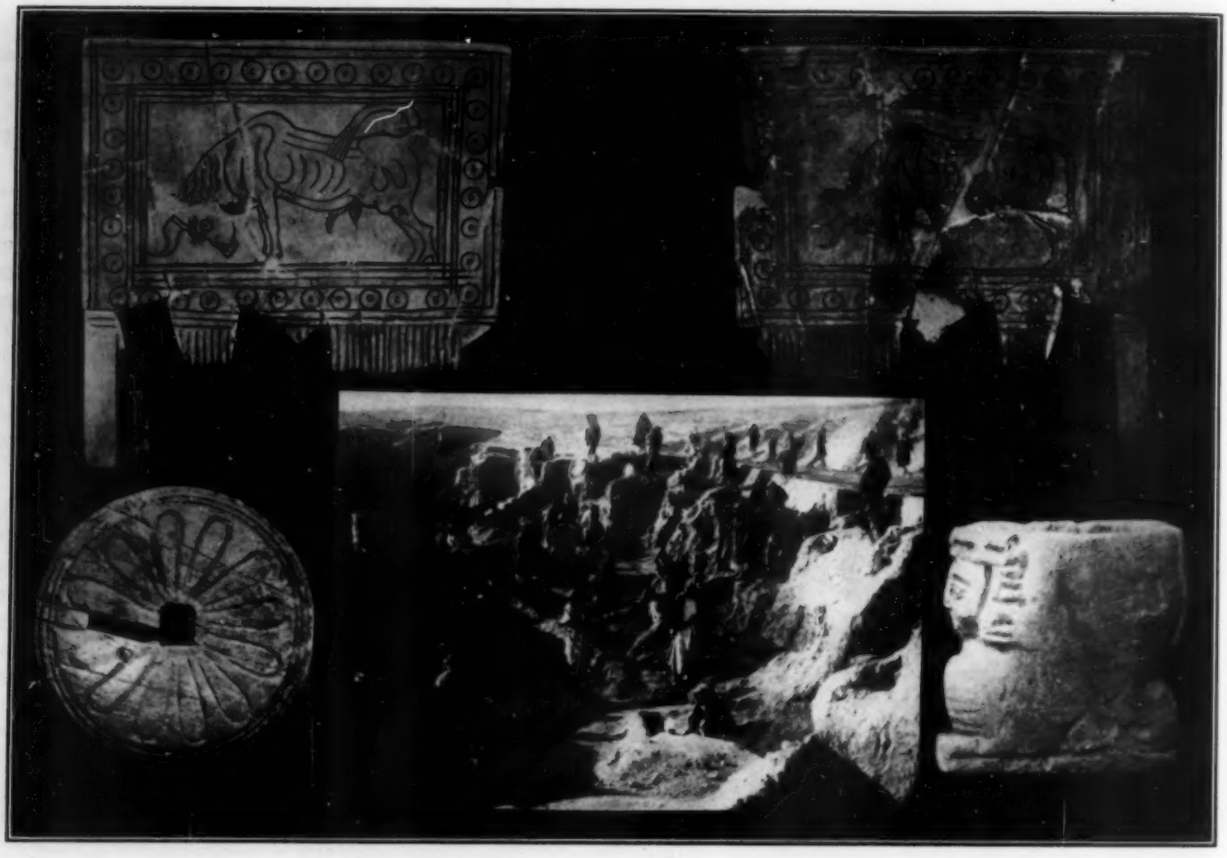
Uniform Feed Essential

If too much material is fed at one time, and somewhat too little the next, the spindle press will twist and turn upon its supports, as when there is more material ahead of the screw than can properly issue from the nozzle, the screw will be forced over sidewards and at an angle to the axis of the machine. The leverage thus obtained applies a very great force upon the ball bearings and forward bearings of the press so that these will very soon wear out.

This irregular movement of the propelling screw of the press has still other major disadvantages. In the first place the rod or tube will issue in a series of jerks, so that the rod will not be uniform in diameter, but will have bulging parts, while at the same time the density of the compressed material will vary from spot to spot. When the rods or tubes are afterwards indurated, or are pressed into sheets, etc., this lack of uniformity will cause high internal strains in the finished material, and is the cause of the breaking, crazing and cracking which causes some people to criticize the casein solids. The cause is not in the nature of the material, but in improper manufacturing operations.

The speed at which the rods issue from the press, and their resultant quality is influenced by the composition of the mixture employed. The amount of chem-

(*Continued on page 120*)



Toilet Ware 3,000 Years Ago

University of Pennsylvania archeologists and British Savants unearth equisitedly carved boudoir accessories

AS in boudoirs of today, in the far-off times of King Nebuchadnezzer, m i la d y ' s dressing table was graced by a toilet set of artistic design. It was while delving into the ruins of ancient Ur, in Mesopotamia, a place of Biblical interest as the home of Abraham, that C. Leonard Woolley made this discovery. Mr. Woolley is the field director of an archaeological expedition working under the joint auspices of the British Museum and the Museum of the University of Pennsylvania.

In those ancient and plasticless days, natural ivory sufficed for the demands of the primitive fabricator in toiletry. The new find includes a mirror with lotus-shaped handle, a paint pot of Sphinx-like form, a powder box, and, outstanding in its exquisitnes, a fine-tooth comb beautifully engraved with figures of a Phoenician bull.

Mr. Wolley, in an A.-P. despatch released Feb. 14, 1927, says that "It was a set which any lady might have been proud of."

In addition to the ivory articles, many exquisite examples of the art of the ancient goldsmiths were unearthed, showing that as far as art was concerned, the civilization at Ur was on a high plane.

Had these historical peoples been familiar with thermo plastics, then, no doubt would have produced some splendid art objects. The illustrations, for which we are indebted to the kindness of Miss Jane M. McHugh, Secretary of Museum of the University of Pennsylvania, depict two sides of an ivory fine-comb, an ivory powder box lid, a view of the excavating activities at Ur of the Chaldees, and a paint pot.

Modern designers of toiletry might study some of these antique creations with profit.

The photographs were taken by the joint expedition.

It is surprising that the ivory should remain in such an excellent state of preservation after being burned for so long a time, but this may be explained partly by the sandy formation in which the material was buried.

Pyroxylin Fabricators' Association Inaugurates Credit Service for Members

THE Pyroxylin Fabricators Association has established a Credit Interchange Service which is now in full working order. The service is conducted along the general lines which have been found successful in other associations and the charges are included in the dues.

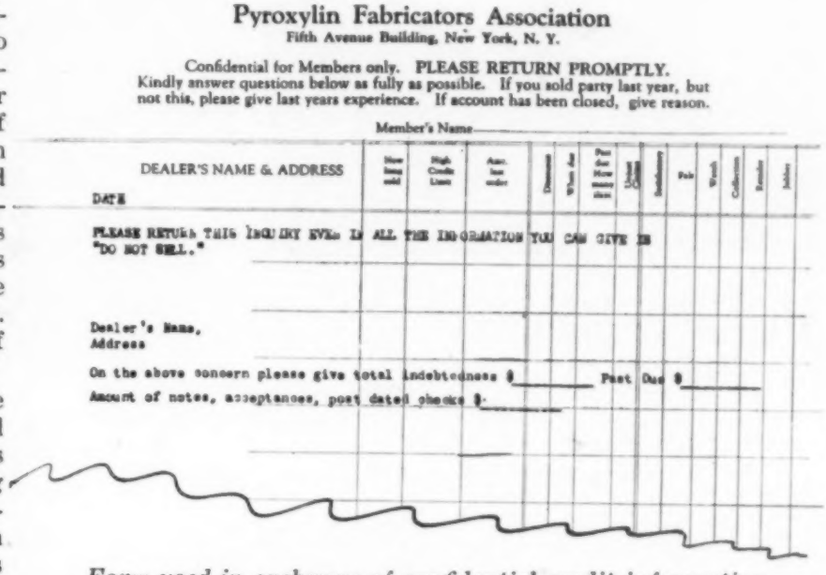
Briefly, it is operated as follows: The members send to the office of the Association requests for information on one or more dealers. The names of these dealers are entered on an inquiry sheet which is mailed to every member of the Association. Each member then fills in under the proper headings experience with each of the dealers listed to whom he sells. We reproduce a photograph of the actual inquiry form used.

The Association compiles the replies about each individual dealer in one report and sends a copy to each member selling that dealer. In that way everyone in the trade has a report on the way in which their dealers are meeting obligations.

The Association also maintains a Collection Service. The first step in the operation of that service is taken by the members in their own offices when they notify delinquent dealers that unless payment is made on a certain date the account will be handed to the Association for attention. If the accounts are not paid, they are placed with the Association, which proceeds along lines similar to those used in other trade association and which have proven very successful in handling past due claims.

Both of these services are being rendered through an office where other trade associations have their headquarters which means that an experienced staff does the work. This office does not take a commercial attitude toward the credit and collection service but instead tries to handle each matter just as if the Association office were a part of the credit department of each member. That assures prompt, thorough, personal attention to each item, and usually retains the good will of customers even when insistent demands are made for payment.

Mr. Morris Marx, the President of the Association tells us that the Credit Bureau is working to everybody's complete satisfaction and the results so far have been all that could be desired.



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Kindly answer questions below as fully as possible. If you sold party last year, but not this, please give last years experience. If account has been closed, give reason.

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Amount of notes, acceptances, post dated checks $ _____

Form used in exchange of confidential credit information.

Lobsters and Crabs May Yield new Plastic Material

VARIETY is adding more than the proverbial spice to the pastics industries, for, according to the investigations of P. P. von Weimarn and his collaborators, it should be possible to produce plastics from the shells of crustacea. Such superficially uninviting materials as the shells of lobsters, crabs, crayfish, cuttlefish and even beetles, may soon grace both milady's person and her boudoir.

The process, which, by the way, has been worked out in Japan, consists in treating the shells with strong solutions of such comparatively inexpensive salts as the chloride and thiocyanates of calcium. Under the correct conditions, the chitin, chief constituent of the shells, is converted into a translucent pastic mass.

Silk Solubilized First

Starting with silk, it is possible to obtain a 30% colloidal solution, from which alcohol will form a threadlike precipitate. The method is to treat silk wadding with ten times its

(*Continued on page 134*)

Durez Plant Rapidly Expanding

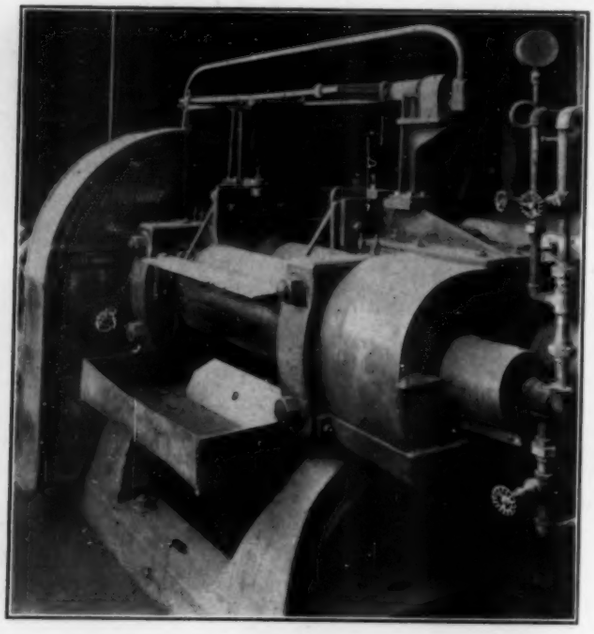
New factor in American phenol resin field shows healthy growth

By Carl Marx

The development of the phenol resins in America has been practically under the control of one organization for fifteen years, due to patents, whilst in Europe the number of Phenol resins offered to the public are rather astounding.

With the expiration of the basic patents in this art a similar development may be looked for. One of the first of the larger concerns in this field is described in the present article.

It is our object to keep the consumers and molders informed of new developments in this industry by stories of a similar nature as new plants start up.



Huge rolls are used to insure the thorough incorporation of resin and filler in making Durez molding powder.

A LITTLE over eight years ago the first foundation for the present large business of the makers of Durez was laid. It was then that Harry M. Dent began his first experiments on the preparation of a phenol condensation product. The way was by no means easy, but as the field proved to be one of exceptional promise, and by virtue of hard and persevering work, success was finally attained.

The production of this new plastic material was begun in a plant now occupied by the Rand Kardex Corp, at North Tonawanda, New York, one of the thriving Niagara Frontier manufacturing towns of the Buffalo and Niagara Falls industrial district.

The first commercial success was attained during 1924. The continued growth of the business finally made it necessary to look around for more suitable quarters. Accordingly it was decided to plan and erect a building designed to best care for this type of manufacture, and the erecting of a new plant of entirely fire proof construction was undertaken, on Walck Road near Erie Avenue, North Tonawanda on the line of the Lockport, High Speed, or fast trolley. The new plant was completed and ready for occupany in August 1926. It is in this plant that the manufacture of Durez is now carried on.

Upon first coming within sight of the visitor, the plant makes a very favorable impression, which is heightened on entering the spacious and well-lighted offices. One of the first things that strikes the eye, is a large display of the articles which are now being successfully molded from the Durez phenol-resin molding compound. This is contained in a well arranged sample case, and similar cases adorn the walls of the office, and that of the officers of the company.

On leaving the office and entering upon the manufacturing department, the immediate impression is one of spaciousness, for the plant is practically entirely on one floor, with very high ceilings; in fact in the resin compounding room, the headspace is well over thirty feet. The present manufacturing buildings have approximately fifty thousand square feet of floor space. The tracks of the New York Central and Erie Railroads, pass the plant, with a siding and loading platform, so that shipments of both raw and finished materials can be made with the least amount of labor and delay.

It is quite evident that a great deal of thought has been given to plant lay-out, and to the most economical routing of the raw materials through the factory. The resin-compounding building contains a number of large iron mixing kettles, which are steam-heated and supplied with the necessary condensers, gauges, etc. It is in these kettles that the phenolic resin which is the basis of the Durez molding compound, is made, the nature of which is maintained as a trade-secret by the organization.

The utmost care is taken to insure an absolutely uniform product, especially as regards hardness, speed of "curing" and color. The resin having been formed and dehydrated in the condensing-kettes, is then cast into slabs, which form the raw material for the making of the compounds.

The next step in the manufacturing operations is the compounding of the molding powder. Two distinct types of operation are employed in the process of production. First, very finely dried wood flour, coloring matter and other fillers are incorported with the pulverized resin by grinding the ingredients together in huge ball-mills, where the material is very completely comminuted.

Compounding

The second operation employed is to more thoroughly incorporate the wood flour, color and fillers on heated malaxating rolls. These are quite similar to those used in the compounding of rubber, and the soft sheets of fused resin and filler are worked back and forth between the rolls until the mass is perfectly smooth and uniform. As the heat on these rolls is not sufficient to polymerize the resin, the resulting product is still fusible. The sheets, which harden as soon as they are cool, are then broken up and the pieces pulverized.

The finished powder is then carefully screened to prevent accidental pressure of foreign materials, magnetic separators assuring the absence of small particles of iron and steel which might disastrously affect the dies when the Durez powder is subsequently molded by the commercial molder. The material is finally packed in steel drums for shipment.

Finished molding powder ready for shipment.

A completely equipped laboratory, both for plant operation control as well as for making physical tests upon the finished molded goods is maintained, and is manned by a number of skilled chemists and technicians. The extreme care taken by the manufacturers is very evident to even the casual visitor, and is especially impressive to one who is familiar with the art, and the difficulties to be overcome and the problems to be met.

Colors Available

The colors thus far made range from deep brilliant black to a light cream tint, with varying shades of brown, red, green, jade, blue, and very fine mottled effects. The latter are attained by mixing suitably colored molding powders, taking care not to get a uniform mixture but to keep the different powders more or less separated so that both colors will be apparent in the finished product. As samples are retained from every lot of molding powder made, and no material is shipped until it has passed the most stringent tests, the user can be sure of getting the results he is after.

Inasmuch as recently the field for the use of plastics is expanding rapidly, it was decided by the General Plastics Corporation to introduce considerable more capital into the business during the past year, but the present concern is being managed as formerly, with Harry M. Dent as President and W. S. Gordon, Jr., as Vice-President. Both of these men are very well known in the trade, and Mr. Gordon probably has a larger acquaintance among the commercial molders than any other single individual in the industry.

It is the combination of good business management and engineering skill which has made the rapid growth of this organization possible. Under the rapidly expanding program, the organization was also increased by acquiring the services of J. F. Snyder as Secretary, W. B. Weaver as Treasurer, Herbert S. Spencer in charge of Advertising and Sales Promotion and George Lewis in charge of engineering.

Sales Offices

Offices have been established in the larger cities. The New York office at Park Avenue and 45th Street, is in charge of Lowell P. Weicker, and that at Chicago, 9 South Clinton Street, in charge of Thomas A. Ryan. Pacific Coast representatives are Clapp & LaMoree, with offices at San Francisco and Los Angeles.

The present output of Durez molding compound is being absorbed by the electrical, radio, automobile, novelty and other manufacturing concerns, each of whom is daily finding new uses for the synthetic plastics.

Properties

Durez, like the other phenol resins, softens under the influence of heat in the molds, and at a pressure of two thousand pounds per square inch will flow into the most intricate form. Further application of heat at approximately 350 degrees F, while still under pressure, will rapidly harden the material so that in a very short duration of time, (about two minutes) the article will have become thoroughly hardened so that it may be removed from the mold without cooling. The article is then completely finished and is not further affected by any subsequent heating up to 300 degrees F. As metal inserts can be placed with the utmost accuracy, machining operations such as threading, etc., are entirely obviated. From a production standpoint this is one of the

(*Continued on page 124*)

Chas. F. Reeves Now Celluloid Company Vice-President

IN a few words, during an interview granted in his office at 58 West 40th Street, New York City, Mr. Charles F. Reeves sketched his active and interesting career and traced the steps that lead to his recent election as Vice-President in charge of sales of The Celluloid Company of Newark.

His first acquaintance with the business world was made some twenty years ago when he joined The Celluloid Company as office boy. The contact then formed has continued unbroken, except for a period during the World War, and his service with the Company has taken Mr. Reeves into many fields of activity.

The first three years were marked by a course of training in the Accounting Department and promotion to a position in charge of the export and import correspondence. Graduation into the sales force followed, with two years on the road as a collar and cuff salesman and seven years of extensive travel selling the Company's line of toiletware.

In May, 1917, Mr. Reeves resigned and volunteered for the Army. He served until December, 1918, when he was discharged with the rank of 1st Lieutenant, and returned to The Celluloid Company.

Upon his return, the Company sent Mr. Reeves to Boston to open a branch office, of which he had charge for five years. He was called back to New York City about three years ago and made Assistant Manager of the Sheet Department. He became sales manager during 1926 and Vice President early this year.

MR. CHAS. F. REEVES

For Machining Plastics

By F. F. Gilmore

Diamonds Make Long Lasting Cutting Tools

WHEN making arrangements to machine Plastic articles in quantities it is well to consider the possibilities of a diamond as the cutting tool. The application of diamond to tools is restricted mainly to turning operations as in lathes, screw machines, etc.

Diamonds are very much harder than steel and when conditions are favorable they preserve their keen cutting edge for a length of time that is incredible to one who has never seen them working. Due to this quality of extreme hardness they are naturally somewhat brittle. This does not prevent them withstanding steady cutting pressure, though it is a warning that one must be careful not to subject a diamond to a sharp blow.

We do not believe any data can be obtained regarding the length of life of a diamond, or the amount of Plastic material removed and the number of pieces finished before the diamond needs resharpening. The durability of its cutting edge results in a smooth surface on the material as well as a uniform accuracy in size of product over many thousands of pieces. For these reasons diamonds have a regular place in manufacturing equipment and are looked upon as indispensible by many who are turning Plastic materials continuously.

There are two kinds of diamonds, first the crystal which appears somewhat transparent, and second the non-crystallized black diamond. The former can be polished to a very keen cutting edge and is usually found superior for taking light cuts where a smooth finish is required; the black diamond is a tougher stone and while it cannot be polished to quite as sharp an edge, it is better able to withstand a heavy or an intermittent, cut.

It is advisable to take up the question with an experienced manufacturer of these tools as to whether or not it would be advisable to use diamonds. A sample of the work submitted for his inspection may reveal certain features that make for or against success. A sketch of the tool is necessary to determine size and cost of the diamond and whether it would be expected to perform satisfactorily.

New French Plastic

Prystal is the name of a new plastic of the urea-formaldehyde group manufactured in France. At present, it is being used chiefly for the production of imitation sapphires, rubies and emeralds. Other outlets are umbrella handles, cigarette cases and toilet novelties.

"A Visit to the Articles Fabricating Department of the Celluloid Company"

See April Plastics

Type of equipment used for drying blood.

Molded Products from Dried Blood

Production methods based upon standard processes of heat and pressure molding

By Leon Bouvier

From Revue gen. des Matieres Plastiques 1926, 2, 307.

In PLASTICS *for December, 1926, p. 431, there appeared an article on dried blood as a base for plastics. The present story is a continuation of the same, and gives the operating details of the process used in producing the articles from the dried blood.*

THE manufacture of articles from powdered blood is a comparatively simple molding process. After adding to the dried blood the required fillers and the necessary agglutinant, the whole is intimately mixed and subjected to heat and high pressure. Powdered blood materials ready for direct molding, as such, are available, notably those from the firm of Winther & Samberg.

Another view of the blood-drying plant.

Type of Press Used

Presses are employed with a working surface of 900 square cms. working at a pressure of 200 kg. per sq. cm. and at a temperature of 100° to 140°C. These will produce 12 kg. of articles per hour and are actuated by pumps capable of developing a prssure equivalent to 400 atmospheres. Owing to the irregular results of electric heating, steam is used as the heating medium.

The molding process is a very rapid one, 10 minutes being required for an article weighing 19 grms. Only a light polishing is necessary after molding. Articles molded at low temperatures are better suited for mechanical working, as they are stronger than those molded at higher temperatures. Their color is usually black and they can be polished very easily. By the use of suitable fillers, light brown products can be obtained. Transparent objects are possible by starting with dried serum containing binders instead of with the whole blood product. The residue from the manufacture of serum can also be used for making plastics almost black in color.

Equipment Comparatively Simple

Although an unlimited variety of objects are possible, up to the present, the chief outlet for this once valueless product has been the manufacture of buttons. The time is near, however, when the luxury article and electro-technical industries will realize the benefits that can accrue from the use of this cheap, easily workable material, one moreover, needing no other

EDITORIAL · IMPRESSIONS

The Phenol Resin Industry and the Future

CONSIDERABLE discussion has been provoked by the recent cut in prices of the several types of molding powders being offered to molders; especially such materials as comprise the phenol resins.

While it could have been foreseen that such a lowering in prices would occur with the entry of new producers into the field, the extent of the cut, which for some grades of material is as high as 50%, is somewhat disconcerting to those who are not thoroughly familiar with the problem.

The first impression upon the uninitiated is that there must have been a very large margin of profit in the products at the old price. However, it is perfectly safe to say that this is not the case. The pioneers who developed the phenol resin field by no means used their virtual monopoly to gouge the molders and consumers, but re-invested a great deal of the profit in continued and intensive research, and it is the benefit of this research that the consumer is now reaping.

Another vital factor in the lowering of prices is the lowering in production cost due to greatly increased mass production. As the raw materials from which the phenol resins are made are practically fixed in price, the only economies in manufacture are along the lines of more efficient handling of the products at the various manufacturing stages, and the use of larger compounding and mixing units, so that the cost of labor per pound of material can be sufficiently reduced.

Needless to say, however, competition will be very keen in the immediate future, and the ultimate gainer will be the industry as a whole. For although the saving in cost of the molding powder will not, in every case, be passed on to the ultimate consumer of the molded product, a lowering in cost of such objects is almost inevitable. There remains another unsolved problem, and that is as to whether the lowered prices will induce consumers of metal and machined articles to turn to molded products instead.

It would appear almost certain that developments in the field of Plastics will take that direction. The substitution of non-conducting molded goods for metallic articles which had to be carefully insulated to prevent short-circuits is a rational step. Another powerful argument in favor of Plastic materials in place of metal is that while metal will corode, rust and tarnish, the better grades of molded materials are perfectly immune from such destructive agencies.

The often raised objection that molded materials will not withstand heat has been met satisfactorily by the phenol-resin type of products, and now even the ceramic art has turned to accurately molded products that will withstand white heat, while still maintaining their rigidity and electrical insulating qualities. Intricate shapes can now be molded, as the advance in the construction of suitable dies has kept pace with the other progress in the art, and it is certain that the next few years will show some truly remarkable developments in the molding of large and complicated objects.

Switchboard panels with literally hundreds of inserts and conducting metallic pieces are being already molded successfully, and the economical production of objects of general utility and of art is just around the corner.

The old belief that molded products were limited practically to the electrical insulation field is fast vanishing. It is up to the producer of molded goods to go out now and sell the world its goods on their intrinsic merit, beauty and utility.

Shellac Plast'cs

WHILE the rapid development of the more modern types of Plastic materials has perhaps overshadowed the older types of material available to the molder of the earlier days, there nevertheless remains one material for which the scientists of the present day have vainly sought a substitute.

It seems strange that a small and apparently insignificant bug feeding upon the leaves of a shrub in far-distant India should excell the skilled chemist in the product of what is admittedly the best thermoplastic resin ever discovered by man. Shellac, button-lac, or simply lac, as it is variously known by different peoples, is a remarkably complex body, and although the chemical constitution of the various ingredients that make up shellac are well known, no purely synthetic product has thus far been produced that combines within itself all the desirable properties of true and pure shellac. It is the thermoplastic material **par excellence**, and as far as phonograph records are concerned, is apparently the only substance capable of the exceedingly accurate molding required for sound reproduction. The various phonograph companies have spent fortunes in research to find a substitute, but thus far in vain.

Many substitutes have been made, but none of them meet each and every requirement. When properly compounded with fillers, coloring matter and fibrous substances such as cotton flock, asbestos, etc., a molded shellac article is every bit as good in finish, accuracy and appearance as the most modern synthetic resin. It lacks only

one thing, and that is insolubility in solvents and resistance to heat. As there are thousands of applications however where these points are of no importance, it is quite evident that shellac will maintain its supremacy in this particular field until the research chemist finally triumphs, and relegates the natural product into the same limbo of forgotten things as he did natural indigo and madder in the dye-stuff field.

It will probably be done; just as it has been found possible to make purely synthetic rubber; but at the present time the cost is too prohibitive, and the natural product still is obtainable at a price which allows it to compete successfully.

Eternal Watchfulness

Despite the continued warnings issued by the various fire-prevention organizations, and numerous articles that have appeared in the pages of PLASTICS regarding the hazards of *careless* working with the pyroxylin plastic materials, the daily press almost every week carries some blatant head-line regarding the "explosion of celluloid." Now all this is not helping the industry one bit, and the real cause is NOT the ready inflammability of this useful material but the almost criminal carelessness shown by the users of the product.

People who would guard gasolene and similar fluids with extreme care will handle pyroxylin shavings and scrap as though they were asbestos. A startling example was an explosion that killed one, and injured 29 at the Berman Shoe Trimming Plant at Haverhill, Mass., on March 5th. It was the discovery of what was a *small* fire in a pyroxylin waste box that started things going, but it was soon followed, by ignition of the combustible gases, by a terrific explosion.

We don't care to be listed as a Cassandra, but, for the best of the industry let us all be *Careful Always.*

"Metalic Resins" Prove New Source of Plastics

Zinc, copper, lead, cadmium, iron and similar metallic compounds of alkyl esters of phthalic acid are resinous in nature and will plasticize cellulose esters.

THE research organization of the Commercial Solvents Corporation, at Terre Haute, Ind., has enriched the field of cellulose ester plasticizers, as well as that of synthetic resins, by new type of product to which has been given the name of "polyvalent metallic salts of alkyl half esters of phthalic acid."

Fortunately, the understanding of the invention is not so difficult as it may sound, and as these new resins may prove useful not only in conjunction with cellulose acetate, as a plasticizer for which they are primarily intended, but also as independently useable plastic materials, a description of the same, by the inventors, Bruce K. Brown and Charles Bogin, may be of more than passing interest.

According to U. S. Patent 1,591,652; July 6, 1925, these substances are used in cellulose lacquers. After a general discussion of the lacquer art, and the difficulties in incorporating gums with the cellulose esters, the patent specifications proto state:

"We have now discovered that certain new synthetic resins, which are substitutes for varnish gums such as have been previously mentioned, may be incorporated in cellulose acetate solutions and that these solutions may be employed to produce films, or as lacquers, without any phenomenon of preciptation or incompatibility. We have also discovered that cellulose acetate solutions containing these resins produce films and lacquers of a quality superior to those obtained from cellulose acetate per se.

"The new synthetic resin which we employ in solution together with cellulose acetate for film and lacquer use are properly describable as "polyvalent metallic salts of alkyl half esters of phthalic acid."

"Briefly we may state that these compounds are prepared by reacting as aqueous solution of the sodium salt of an alykyl half ester of phthalic acid with an aqueous solution of a polyvalent metallic salt, whereupon there is precipitated the desired compound. For example, the sodium salt of the monobutyl ester of phthalic acid reacts with zinc chloride in accordance with zinc chloride to form the zinc salt of the monobutyl ester of phthalic acid.

"Salts of other polyvalent metals such as copper, lead, cadmium, iron, mangenese, nickel, cobalt, etc., give similar

(*Continued on page 132*)

Mechanical Spring Press Obviates Need of Hydraulic Machinery

THERE has recently been placed on the market a new type of mechanical spring press. This press is particularly adapted to the molding of Mechanical Rubber Goods, pyroxylin plastics, casein, fiber and all other synthetic plastics.

The outstanding feature of this press is the fact that it is purely mechanical, thus eliminating the necessity of hydraulic pressure and their expensive accessories. This is another step forward in the art of molding, making it possible for the manufacturer to obtain greater production, less spoilage and at a considerable less cost. The maintenance cost of such equipment is practically neglible as compared with hydraulic maintenance. The reason for this is that this press is virtually a machine tool requiring only proper lubrication. The press is operated by an individual motor, compound gearing cam and toggle, and has especially constructed springs which retain the pressure while curing, the motor being shut off during this period. Such an arrangement is ideal for low operating cost.

The press is unusually easy to operate. A friction clutch is thrown into engagement by a lever at the side of the press which causes the press to close. The press is automatically stopped at the top of the stroke and at the bottom of the stroke. The curing period may be operated mechanically if desired. That is, each press may be equipped with a timing device that will control steam and water at desired intervals and automatically cause the press to open when the curing period has elapsed. This feature enables one man to operate more than one unit at the same time and eliminates the necessity of his opening the press at the end of the curing period.

Each press being a complete molding unit, valuable space occupied by pumps, and similar equipment can be utilized to better advantage. These presses can be obtained for any tonnage, number of platens, size of platens and stroke.

The press has been developed by the Terkelsen Machine Co., and the results obtained in practice are very promising. As its use becomes more universal, we shall have more to say on the subject later.

Molded Products From Blood

(*Continued from page 113*)

appliances than molds and presses. When one recalls the formidable equipment of a casein solids' plant, the costly plant needed for corozo, or the still costly phenol resin compositions, one may justly inquire why dried blood is still so little known and so rarely used.

Other methods of fabrication have been sought. Kaspar has pointed out that if blood serum, formaldehyde and nitrogen peroxide (?) are mixed in suitable proportions, there results a clear solution which very quickly solidifies into a moldable plastic mass. The latter resembles horn, but as it is too brittle alone, phenol is added as a plasticizer.

Blood-Formaldehyde Compositions

Here for instance is a formula which, it appears, gives good results. 100 parts of dried beef blood serum are mixed with 25 per cent of formaldehyde and 0.30 parts of trioxymethylene. Next 85 parts of phenol together with sodium peroxide dissolved in water to a slightly alkaline reaction, are added. Finally 10 parts of sodium sulfite are added to the mass.

After heating for an hour, the mass is heated again in suitable molds until it becomes hard. In this way, an artificial product results capable of being turned, drilled and polished, and which, moreover, is resistant to acids. By incorporating fillers, such as powdered paper, wood ashes and the like, the cost of the plastic is reduced and the strength increased. If a little castor oil is added, its elasticity is increased greatly, but it cannot be polished so easily. In place of phenol, a solution of casein containing borax can be used, but here it is a good thing to add castor oil in order to reduce the brittleness. By combining the serum with any metal salt to begin with, and then hardening the mass with formaldehyde, the product becomes resistant to moisture and very hard, so that it can take a remarkably high polish.

A process for preparing blood for the manufacture of plastic solids, is due to F. Vesey Fitzgerald, German Patent 394,330. Before coagulation, the blood is dried at a constant temperature, slightly higher than 49° in a current of air. Coagulation is brought about by chemical reagents. It is then run in a thin film into hot water to cause the solids and liquid portions to separate. The solids are then removed by straining, filtration or other means. Hydrated lime can be added to the blood before treatment.

German Interest Aroused

As an indication of the attention that the fabrication of dried blood plastics deserves, the Germans have expressed themselves in this wise "It is essential for our manufacturers of plant to learn much from the experts and to seek to drive from the market foreign and costly casein. This is possible, for our abbatoirs and very active and large quantities of blood, formerly lost, are now collected and turned into dried products. An application of such high economic value demands the efforts of our people and our industry also."

Blood Plastics in Denmark

ACCORDING to a report issued by the Department of Comerce, plastics made from dried blood have been employed in Denmark since 1916 for the manufacture of buttons principally and for electrical parts in a small way. One firm appears to use a dried blood plastic consisting exclusively of blood, and there is a limited outlet for dried blood of American origin.

Pyroxylin on Queen Marie's Typewriter

The January issue of the Du Pont magazine contains an interesting account of the pyroxylin finish and space bars used on a specially constructed Remington Noiseless typewriter presented to Queen Marie of Roumania on her recent visit to the U. S.

How Expiration of Some Bakelite Patents Effect Prices

A REPRESENTATIVE user of the phenol-resin type of products was recently interviewed as to his opinion of the effects of the basic patents on Bakelite. The opinion appears to be that there would be no disturbance of present prices, but since this was written two of the largest producers of synthetic phenol-resin molding powders have reduced their prices. This makes the prediction of the party interested all the more interesting, for it may be expected in the industry a few years hence when some more of the patents expire. There is no doubt but what the prices of the essential raw materials will be the deciding factor in fixing the ultimate price of phenol-resin products. The opinion follows

"The expiration of the basic Bakelite patent on the production of phenolic resin has lately been the cause of a great deal of comment in the electrical trade, regarding the conditions in the market that are likely to follow. It is therefore important to understand just what patents have expired and which ones are still in effect.

During November, 1926, the patent covering the basic phenol resin ran out, as did also the patent covering the method of hardening this resin under heat and pressure, shortly thereafter.

It is therefore now permissible for any one to engage in the production of the basic resin, but a large number of supplementary patents remain, which will prevent for some years the utilization of this product in various processes.

In the field of Laminated Bakelite, there are still two very essential

(*Continued on page 124*)

Final Briefs Filed in Bakelite Tariff Case

NEW hearings in the Bakelite Tariff case before the Tariff Commission, foreshadowed in February PLASTICS, have now been completed, and February 19th set as the closing date for the receipt of briefs from interested parties.

The original compaint filed by the Bakelite Corporation cited a group of importers for alleged infringement of patents and unfair trade practices in the sale of certain imported cigar and cigarette holders. Counsel for the importers contested the validity of the patents on the ground of expiry, and argued that there had been no misrepresentation as the articles in question had been purchased after December 1926, when one of the patents expired.

Joseph Luchs apeared for the Corporation and J. W. Bevans, representing the National Council, American Importers & Trades, Inc., defended the stand taken by the importers.

Pyroxylin Exports and Imports

Domestic Exports of Pyroxylin Products From the United States November, 1926

	9821 Manufacturers of		9820 In sheets, rods or tubes	
	Pounds	Dollars	Pounds	Dollars
Belgium	1,702	2,300	———	———
France	715	303	———	———
Italy	2,669	2,573	———	———
Spain	———	———	28	109
U'ted Kingdom	63,026	28,211	14,648	15,901
Canada	142,020	111,467	123,694	130,928
British Honduras	———	———	3	7
Costa Rica	39	53	35	170
Honduras	———	———	57	80
Nicaragua	———	———	1	6
Panama	———	———	481	881
Salvador	———	———	180	424
Mexico	203	152	4,055	5 859
N'foundland & Labr.	26	28	———	———
Bermuda	———	———	14	12
Trinidad & Tobago	———	———	47	146
Cuba	454	462	803	1,886
Dominican Republic	———	———	192	192
Dutch W. Indies	———	———	73	51
Argentina	———	———	494	1,004
Brazil	39	40	40	317
Chile	———	———	25	50
Colombia	———	———	98	188
Ecuador	———	———	45	155
British Guiana	20	21	———	———
Venezuela	85	101	125	150
Brit. India	101	118	———	———
Ceylon	103	96	———	———
China	———	———	140	238
Java & Madura	———	———	39	43
Japan, inc. Chosen	3,425	2,458	303	375
Philippine Islands	422	604	1,159	1,565
Australia	13,701	10,422	9,205	7,589
Brit. Oceania	60	45	———	———
French Oceanin	———	———	46	83
New Z'land	158	140	52	25
Brit. S. Africa	1,584	597	27	85
Total	230,552	160,191	156,110	168,519

The exports of finished articles is practically twice that which it was in October, 1926, the figures for which month appeared on p. 18 of the January issue of Plastics.

Pyroxylin Doll Tariff Lowered

IN response to a protest of S. H. Kress & Company, New York City, the U. S. Customs Court in New York lowered the tariff rate on imported pyroxylin plastic dolls from 70% ad valorem as toys, to 66% ad valorem as articles.

Effect of Patent Expiration

(*Continued from page 120*)

patents in force. One of these is the Varnish Patent, No. 954,666, which covers the production from a phenol resin. of a Varnish such as is essential for the production of Laminated Bakelite. This patent expires in 1927.

Still more important in this field, is the so-called Laminated Patent, No 1,019,406, which covers the use of phenol resin products in a laminated material—that is a material built up of fibrous sheets, impregnated with a varnish.

Hence, although it is now legal for any one to make a basic phenolic resin, such a resin may not be used for laminating purposes for four years to come, without infringing this patent, under which, of course, the seven laminators using the product of the Bakelite Corporation are licensed.

In the Gear field, the Bakelized Canvas Gear material is protected by still another Patent, the so-called Miller Patent, No. 1,061,770, owned by the General Electric Company. This patent does not expire until 1930.

It is doubtful whether the expiration of all these patents, would have much effect on the market, or the price situation. It is known among both Bakelite molders and laminators the less efficient concerns are operating on extremely narrow profit margins or none at all—the situation in this regard being similar to that in industry at large.

With its large modern plants for the production of its products, as well as for its essential raw material—phenol—the Bakelite Corporation is in a position to produce phenol resins at costs that it would be extremely hard to equal in the United States.

The outlook therefore, does not indicate the approach of a violent upset in the Bakelite market, but rather a stabilized condition, with prices at or near present levels for several years to come."

"Haveg"

An Acid-Proof Molded Wood Substitute

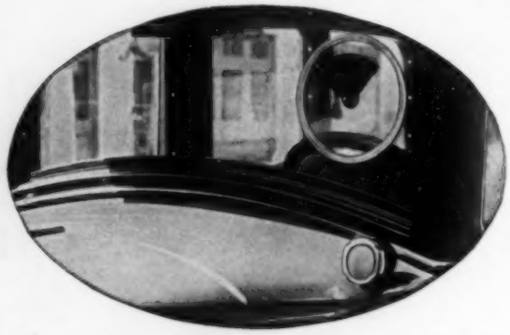
According to an article in the French Revue generale des matieres colorantes, 1926, 40, No. 355, p. 241, the German firm known as the Sauereschulzgesellschaft of Berlin is putting on the market a resinoid product somewhat resembling wood, known as **Haveg** but which is stated to consist of a special grade of asbestos fibers high in silica, and impregnated with phenol resins. The material is used especially for protecting metals from wood, and for making acid-proof containers. The material is said to possess a breaking-strength of 800 kilograms per sq. centimeter, and 400 kilograms per square centimeter resistance to bending strains. It will withstand temperatures up to 200°C. Suddenly heating to 130°C followed by rapid cooling does not hurt it. 50% sulfuric acid, nor concentrated hydrochloric acid attack it, and a special grade, "Haveg 43" is even resistant to hydrofluoric acid. Metallic salts such as zinc chloride, hypochlorites, chlorine water, and even melted sulfur at 130°C are without deleterious action. It is stable to organic acids, and formic acid up to 40%. However, alkalies and nitric acid attack the material.


Inda
[non-inflammable]
Buttons---
TO the button manufacturer we offer a material of exceptional merit and adaptability. Inda, the perfected casein solid, may be worked with ease, and because of its perfectly homogeneous nature, does not quickly dull cutting tools.
It takes a high, permanent polish, and because the coloring is not applied to the surface, but is an integral part of the material, undesirable effects are not obtained when the original surface is cut away.
Inda is non-inflammable, and does not warp, crack, check or split. It is available in sheet, rod or tube form, in all plain colors and in beautiful metallic and non-metallic mottles.
American Machine & Foundry Co.
5502-5524 Second Avenue, Brooklyn, N. Y.

Pyroxylin Anti-Frost Device Prevents Accidents

From DuPont Magazine, January, 1927

OF the more recent automobile safety devices to appear on the market, few are more unique and serviceable than the Pyralin "anti-froster" illustrated here. It is designed to help the motorist who is forced to drive through winter storms by eliminating one of his greatest annoyances — a frost-covered windshield.



The strain of driving in winter is greatly reduced by fastening this Pyralin anti-froster to the windshield of your car.

The "anti-froster" is manufactured by the Hedeen Company of Brainerd, Minnesota, and is enjoying considerable popularity throughout the country. While its prime function is to prevent the icy film on the outside of the glass, this accessory is also claimed to prevent the accumulation of vapor on the inside surface. The "anti-froster" takes care of both sides at the driver's wish. The illustration shows the Hedeen Company's large-size product, fitted with an amber-colored glare shield, also made of Pyralin. Two other types are available, the Small Clear and Large Clear. That pyroxylin was chosen is due to the fact that it possesses extreme durability, is easy to clean by washing in warm water and rinsing in cold water, and is good-looking.

Still another use for pyroxylin in winter driving has been uncovered. A great many car owners are using transparent sheets on the inside of each window. Thin sheets can be procured and easily trimmed to size by a trimmer or the car owner himself. They are then cemented to the glass. These two methods for combating the unpleasantness of cold weather driving have long been needed and no doubt will be used wherever the storm kings play this winter.

Some Facts on Casein Solids

The American casein plastics industry is at the outset of its career as a purveyor of beautiful insulating material to the electrical material to the electrical industry at a reasonable price. Research work is under full headway. Almost every week the **Patent Gazette** notes applications for all sorts of combinations of other materials, such as rubber, etc., with casein in the production of plastics. A German patent was recently granted for the utilization by repressing of the scrap from casein plastics. Heavy imports of finished material into which casein plastics enter have prompted American manufacturers to plead for better tariff protection for their industry which is one of the genuine infant industries of post-war days. But the American manufacturers are undaunted. One said to the writer he would not be satisfied until his plant was so self-contained that his company owned the herds of cattle from which would be supplied the raw casein, so that from the very beginning of the raw material, before it is formed in the mammary glands of the cow, feeding can be scientifically adjusted to the properties the electrical consumer demands in the finished product.

Emile Hemming in his "Plastics and Molded Electrical Insulation" says that in 1885 Emery Edwin Childs of Brooklyn, N. Y., took out what appears to be the first patent for manufacturing plastics masses from casein. While, according to this authority, the pioneer work in the development of casein plastics was another of the many achievements that Americans have to their credit, the commercial development of the product was partly French and partly German.

More About Durez

(*Continued from page 111*)

such as threadnig, etc., are entirely obviated. From a production standpoint this is one of the most important advantages of the phenol resins.

The mechanical and physical characteristics of molded Durez are as follows: Dielectric strength, approximately 300 to 500 volts per mil. (1/1000th of an inch); tensile strength from 4,000 to 5,000 pounds per square inch; specific gravity from 1.33 to 1.91 depending upon the grade, color and type of filler, and heat resistance approximately 300 degrees F. The Durez molding compound has found satisfactory application in automobile ignition work as it does not soften by heat nor suffer injury from oils, gasoline or moisture. Furthermore commercial applications cover bowling balls, toilet sets and similar large objects, where Durez has met extremely severe mechanical tests. It has also met the difficult color requirements of fountain pens, electrical wall plates, radio parts, etc.

With increased production assured, it would appear that this product is certain of a prosperous future. The chemists and engineers of the organization will actively cooperate with manufacturers in helping them to solve the problems that arise in adapting Durez to their particular needs and to work out entirely new uses.

The establishment of the plant

(*Continued on page 137*)

Acrolite

(*Continued from page 105*)

flour, color, etc , into the resin while in the plastic state.

Laminated materials are made by impregnating paper, fabric, or asbestos sheets with liquid varnish. The solvent in the varnish is driven off by heat, leaving the fibrous sheet impregnated with the potentially reactive resin.

Articles can be molded from the impregnated sheet or molding powder by subjecting it to hydraulic pressure of 1000 pounds per square inch and at a temperature of about 300° F. The molding operation is carried out in hydraulic presses equipped with steam-heated platens. During the pressing the resin is chemically changed from the soluble, fusible to an insoluble, infusible condition. The moded articles are chemically inert, water-repellent, and unaffected by atmospheric conditions. They possess a dielectric resistance of 700 to 800 volts per mil and can be machine punched, sawed, or drilled.

"Acrolite" will withstand a higher continuous temperature than any other synthetic resins now on the market. Its luster is superior to that of any resin heretofore manufactured.

Automatic Hydraulic Press

In response to many inquiries we wish to inform our readers that the press described on p. 61 of the February issue of PLASTICS is made by the Hydraulic Press Mfg. Co.

Through an oversight a line crediting the illustration to this firm was inadvertently omitted.

Watch for an IMPORTANT ANNOUNCEMENT on a New Department in PLASTICS in APRIL

TECHNICAL ABSTRACTS
AND PATENT REVIEW

Cellulose s'earate, palmitate and laurate. E. Gault and P. Ehrmann, Bulletin de la Societe Chimique (Paris), 1926, 39, 873.

Cellulose stearate, palmitate and laurate have been prepared by acting upon hydrocellulose made by the action of sulfuric acid on cellulose with the corresponding acid chlorides of the particular acid with which the cellulose was to be esterified. Mono, di and tri-esters have been produced. The reactions were carried out at 110°C, and the solubility of the products decreases as the number of carbon atoms in the acid radical increase, while the solubility increases proportionally to the copper number of the hydrocellulose employed. The plastic properties of the new esters depend to a large degree upon the amount of degradation of the cellulose molecule. When non-modified cellulose is esterified with these acids, the products are insoluble. The new products made, however, are all characterized by their ready solubility in aromatic hydrocarbons.

Fluxed Synthetic Resin Composition. Carleton Ellis, Montclair, N. J., assignor to Ellis-Foster Co. U. S. P. 1,579,195; Mar. 30, 1926.

The phenolic resins exemplied by the cresol or xylenol condensation products, and especially the magnesia-containing resins of the same inventor, are used in what might be termed an "overcured" condition; or where the condensation and polymerization has already progressed well along to the infusible stage. Such resins are therefore mixed with a "fluxing" agent as hexamethylenetetramine, when they will mold perfectly and rapidly. 33 claims cover the process.

Magnesium-containing Synthetic Resin. Carleton Ellis, Montclair, N. J., assignor to Ellis-Foster Co., U. S. P. 1,580,424; Apr. 13, 1926.

Synthetic resins of the phenol formaldehyde type are made without the use of the usual catalysts, but with the aid of magnesium compounds. For example 94 parts by weight of phenol and 6 to 8 parts of magnesium hydroxide, or approximately one-fourth the normal chemical equivalent of phenol are mixed and heated with 94 parts by weight of aqueous formaldehyde of approximately 40% strength. The temperature is maintained at 90 to 95°C. and the mixture stirred. The magnesium hydroxide, which is insoluble in water and in formaldehyde solution begins to dissolve and eventually a dark red homogeneous solution is obtained. The heating and stirring are continued for about three hours. The solution contains the magnesium phenate resin. It can be isolated and used for molding. (See 1,579,195, above. Ed).

Molding Composition Containing Magnesium Phenol Resins. Carleton Ellis, Montclair, N. J., assignor to Ellis-Foster Co. U. S. P. 1,580,425, 1926.

A molding compound is made from phenol, magnesium hydroxide and formaldehyde. (See 1,580,424, supra). 100 parts of phenol and 28 parts of magnesium hydroxide and 110 parts of 37 to 40% strength formalydehyde are boiled together for 90 minutes. It is not necessary to use a closed vessel. A solution is obtained which is thin when hot and of molasses-like to jelly-like consistency when cold. The solution will contain 56% of solid material as determined when drying in vacuo. The hot solution is mixed with a filler, such as wood flour; a preferred quantity being one equal in weight to the total solids of the solution. By applying the boiling solution to the wood flour an excellent effect is obtained in that impregnation of the fibers occurs and the molded articles will exhibit a desirable degree of translucency.

The mixture is then placed in a dryer such as a vacuum pan or rotary drier and the moisture removed. For example when spread out in layers ½-inch thick in the pans of a vacuum dryer approximately one hour drying at 28" vacuum will suffice. After removal from the drier the then lumpy material is ground in a pebble or ball mill. The powder can be used for molding, curing readily at 160 to 170°C in from 2 to 6 minutes. 1% of aluminum palmitate may be added to prevent sticking in the molds.

Die For Molding Plastic Materials Such as Sound Records. Louis G. Sylvester and Cyrus B. Wells, Scranton, Pa., assignors to the Scranton Button Co., Scranton, Pa. U. S. P. 1,582,704; Syrus B. Wells, U. S. P. 1,582,714; both Apr. 27, 1926.

Dies for molding phonograph records. Improvements deal mainly with spiral channels for rapid heating and cooling of the dies.

ARTIFICIAL STONE MADE WITH CELLOPHANE. A. Herscovitch, U. S. P. 1.588.728; June 15, 1926.

Making artificial stone of the Sorel cement type, by mixing magnesium chloride solution with magnesium oxide and powdered mineral fillers and then troweling the material onto a surface of a cellulose film which he calls "Cellophin" (cellophane—a viscose—type of film widely used for wrapping.) As the film gets wet it crinkles, and when the cement sets and the cellophane is stripped from the artificial stone, it leaves it with a crinkly surface, enhancing its artistic appearance.

PYROXYLIN GOLF TEE. W. S. Sillcocks, assignor to the Sillcocks-Miller Co., South Orange, N. J. U. S. P. 1,588,815; June 15, 1925.

A golf tee comprising a thin shell with a frustro-conical ball supporting portion. It is made of a pyroxylin plastic.

Chemical Technology of Casein Solids. O. Manfred. Caout. et Gutta-percha, 1927, 24, 13417.

A review of the processes of manufacture of the casein solids, especially by use of the extrusion press. Actual formulae of various mixtures are given, coloring matter to be employed and details of the various operations.

ARTIFICIAL RESINS AS PRESERVATIVES. J. Brunner and E. Scheele, S. P. 1,588,164; June 8, 1926.

A process of preserving physiological specimens, which consists in embedding the specimens in an artifical aldehyde resin.

Fireproof plastic material. J. Gallet and L. Olmer, British Patent 261,357; Oct. 27, 1926.

A wood substitute and electrical insulator is made by adding mixed solutions of sodium and potassium silicates, containing an excess of silica, to a mixture of mica, asbestos and lime. Kaolin and lime-glass may replace some of the mica. A small proportion of sawdust may be added to prevent too rapid hardening of the surface, and the addition of glue renders the product softer and less porus. The composition is molded and dried at a temperature less than 200°C.

Cellulose Nitrate Films. John A. Wilson, assignor to the Duratex Corp., U. S. Patent 1,603,499; Oct. 19, 1926.

The process of retaining camphor in celluloid which consists in coating newly made celluloid with a thin sheet of a solution containing cellulose nitrate, a solvent, a diluent and a non-drying vegetable oil and subsequently removing the solvent.

Celluslose Acetate, D. A. Nightingale, assignor to The Ketoid Co., Wilmington, Del. U. S. Pat. 1,604,471, Oct. 26, 1926.

100 lbs. cotton suspended in 1000 lbs. ether are treated with keten, benzene sulfonic and being used as a catalyst. Cellulose acetate forms by direct addition of the keten to the cellulose, water being formed.

The Chemistry of the Natural and Synthetic Resins. By T. Hedley Barry, Alan A. Drummond and R. S. Morrell. 196 pp., price $5.50, New York, 1926.

ONE of a series of monographs on oil and color chemistry, under the general editorship of one of the authors, Dr. R. S. Morrell, the volume under review is the work of three English chemists, who are recognized authorities in this field, one of vital interest to the Plastics Industries.

The work is divided into two sections dealing with natural and synthetic resins, comprising 112 and 70 pages, respectively. With regard to the synthetic resins, Dr. Morrell and Mr. Drummond have endeavored to provide up-to-date information on the resins themselves, their manufacture, and the principles underlying that little understood process of resinification, until recently obscured by a fog of patent specifications.

Points of interest in Chapter I, on physical properties, are the method of determining hardness, which closely parallels the Brinnel hardness test for metals, and the method of etching followed by microscopic examination, very reminiscent of metallography.

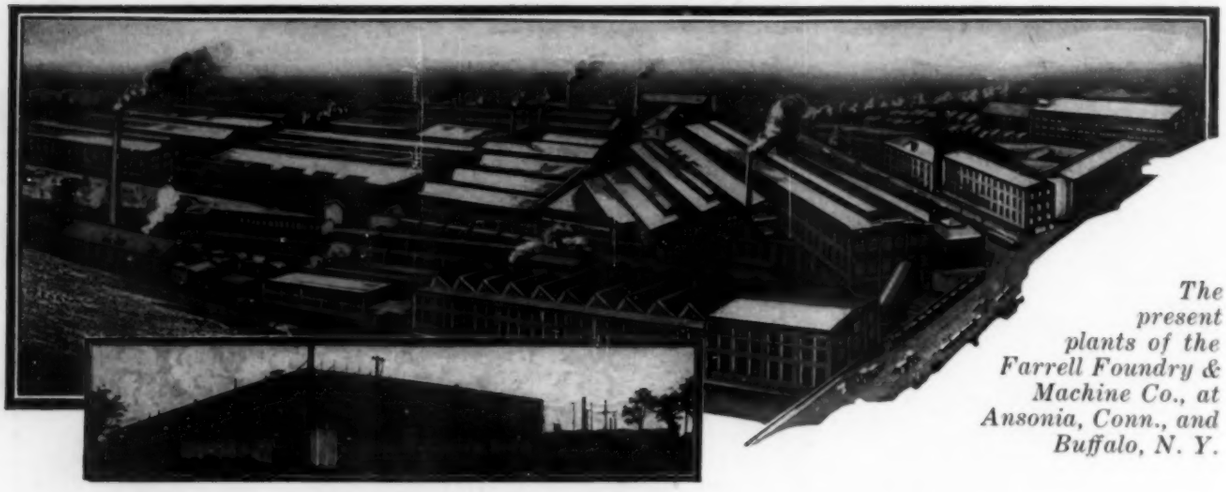
Then follows Chapter II, wherein chemical properties and examination are discussed. The **resenes**, for instance, although hydrocarbons and naturally chemically inert, have apparently little influence on the durability of the resins, a quite unexpected result.

Chapters III and VI treat of hard, semi-hard and spirit varnish resins consecutively. Rosin, turpentine, mastic, sandarac and other soft resins are then taken up, followed by a short outline on Japan and Burma lacquers. Shellac, that stand-by of the molder, comes in Chapter X, and, in 20 pages, is discussed from many points of view, bringing Section I to a close.

In their introduction to Section II, the authors point out that our chemical knowledge of the processes involved in the manufacture of the synthetic resins has not kept pace with advances in technology. A similar state of affairs prevails in the allied rubber and casein solids industries, however. The phenol resin industries are now the largest consumers of phenol in America, the output of the latter raw material having increased eightfold over a recent three year period.

Chapter XI treats of the phenol-formaldehyde group, their manufacture, properties and chemistry, and includes a table of comparative data for these resins and the natural products. Then follows a study of the mechanism and causes of resin formation.

A chapter is devoted to resins derived from coumarone, indene and acrolein, the raw material for the first being solvent naphtha, a coal tar distillate. Other aldehyde resins are next treated in a somewhat brief fashion, and under this category, the important group of resins derived from urea receive an amount of attention, too slight for their interest and widely ranging properties. A chapter on methods of testing brings to a close, this interesting, well-written and authentic monograph.

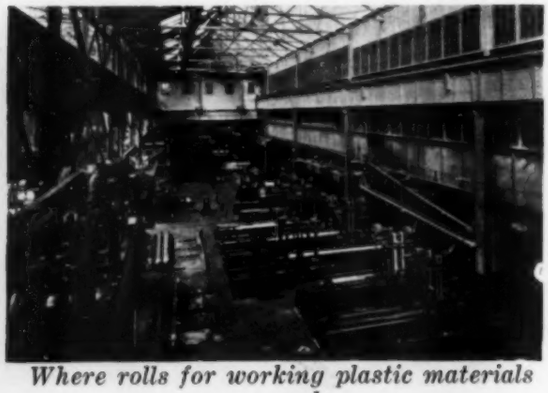


The present plants of the Farrell Foundry & Machine Co., at Ansonia, Conn., and Buffalo, N. Y.

Pioneer Machinery Firm in Business 75 Years

From the rubber calenders used by Goodyear in 1854 to the modern celluloid mill and molding press

THE Farrel Foundry & Machine Co., one of the leading manufacturers of Celluloid and Plastic Machinery, started in 1848 or more than three-quarters of a century ago when Almon Farrel and his son, Franklin Farrel, started in business with a small plant at Ansonia, Conn. They first manufactured power drives and gears for installation which, at that time, ran by water power. With this start, it was not long before they commenced to build rolling mills, calenders and other roll operating mechanisms. The brass industry had taken root in the Naugatuck Valley, which includes Ansonia, and some of the first mills produced were for the rolling of this metal.



Where rolls for working plastic materials are made.

In 1854 some rubber calenders were built for Mr. Goodyear, as shown by Mr. Franklin Farrel's diary. At that time it was necessary to import chilled iron rolls from Great Britain. Before the death of Mr. Farrel, however, the situation with regard to chilled iron rolls had been reversed and Farrel Foundry & Machine Co. was manufacturing and shipping rolls to all parts of the world.

The production of rolls, quite naturally led to the building of calenders for the paper industry and this was followed by the manufacture of sugar mills about 1870. At that time there were several other American manufacturers who were building sugar mills for the West Indies, and of these, the Farrel Foundry & Machine Co. is the only one surviving.

The original products, power drives and gears, are still manufactured, but in addition service is now given to five basic industries by the manufacture of metal rolling mills, rubber mill machinery, paper calenders, sugar mill machinery and plastic material machinery.

The plant as established in 1848 has expanded into 13½ acres of modern plant space on the banks of the Naugatuck River, with a branch plant at Buffalo, N. Y., which has three-quarters of the main plant's capacity.

This company can look back upon an experience of over seventy-five years in building machinery.

In the making of pyroxylin plastics of course, the most important operation and that requiring the most skill, is the rolling of the material. It is very essential that the rolls used for this purpose should be as mechanically perfect as it is humanly possible to make them in design, material and workmanship. To produce such rolls has required an experience of many years to develop the proper methods.

The plant of 60 years ago.

The Manufacture of Casein Plastics

(*Continued from page 107*)

icals, coloring matter, etc., must be adjusted to the pressing speed by experiment, and when once the proper data has been obtained, this should be tabulated and these tables referred to when making subsequent batches. It should be once more pointed out that real success lies in the proper adjustment of these variables, and the care given to this phase of the manufacturing process will be well repaid in uniform and satisfactory finished products.

The proper choice of nozzles is also important. These should be adjusted, especially with duplicate and triplicate nozzles, in accordance with the size of the rods, so that a constant production (by weight) of the machine per given period of time can be attained.

Temperature Control

Another important feature in pressing casein solids rods and tubes from extrusion presses is to watch very carefully the temperature of the operation, as fluctuations in the temperature will be productive of variations in the properties of the product turned out. It is advantageous to heat up the spindle presses for 20 to 30 minutes before starting in to work them, and to do this slowly and uniformly. When starting to extrude the rods and tubes the nozzle should be hot and the head of the press fairly warm, as otherwise there is danger that the head of the machine will be cracked by the excess pressure, or else the ball bearings and other bearings might be sprung or otherwise injured. When the operation has once been started, the temperature should gradually be lowered, but frequent and violent fluctuations in the working temperature should be carefully avoided. If the rod issues smoothly and uniformly from the machine it is well to keep it going without much experimenting as otherwise the product will not have the desired degree of uni-

formity which is such an important point in the production of casein solids of satisfactory properties.

If, on the other hand, the rod does not issue as it should, the cause should be immediately investigated, without however applying force or doing something drastic. The temperature which is the best for working any individual lot of material differs a little according to the nature of the product. The temperatures to be mentioned have referene to the heat of the extrusion press. This varies from 36°C to 60°C, (97°F to 140°F), the latter being the maximum. The forward part of the machine should simply be warm to the touch, and the spindle-housing should even be slightly cooled. The temperature is kept up partly due to the friction developed by the pressure of the extrusion.

Single or Double Presses

The single rod press with suitable conveying belt or table is preferable to the kind that produces two or more rods at a time, and particular care should be given to ready accessibility of all the parts of the machine. It is admitted that a multiple rod spindle press enables one to get along with less operators, but the loss in time when one of these machines gets out of order usually more than equalizes the cost of the extra operative. The use of double or single internal driving screws, which have a decreased pitch toward the discharge end is purely a matter of choice and experience. A single screw machine, with the same number of revolutions per minute as a double-screw machine will furnish from 50 to 70 kilograms of extruded rod per 8 hours period, and a double-screw machine from 100 to 130 kilograms in the same time. This corresponds to about from 110 to 154 and 220 to 286 lbs.

A few other pointers should be mentioned. The oil in which the ball-bearings run should be replaced at given intervals. The work should be so laid out that certain extrusion presses are to

be used only for light-colored material and others for the darker colors, as this minimizes the difficulties encountered when cleaning the machines to change from one color to the other. As regards the material which remains in the presses after completing a run, careful operators can manage to reduce this to a minimum, so that there is but little waste from this source. The openings of the machines should be carefully closed with suitable covers when the same are not in use, as dirt and foreign materials might gain access and be the cause of disturbances when again resuming operations.

The extrusion presses should not be constructed of too light material and should be capable of standing a high pressure as this is necessary for the production of a fine-grained Buffalo Horn effect. Another point to be taken into consideration when investing in an extrusion press is to see that it is provided with a good oiling system, as otherwise some of the lubricant can get into the forward part of the machine and mix with the casein solid, and ruin it. On the other hand the packing should be tight enough to prevent the casein powder from working into the oil-bearings and obstructing the bearings.

This article will be continued in the April issue of PLASTICS.

The Celeron Co.

This company has been formed to operate as a separate division of the Diamond State Fibre Company. It will manufacture and sell a complete line of celeron materials including laminated sheets, rods, tubes, machined shapes, moulding powders, varnishes, resins, etc.

Metallic Resins

(*Continued from page 116*)

compounds. Other alkyl half esters of phthalic acid may be employed—for example the ethyl, propyl, or amyl esters.

"These compounds may be generally characterized as solid stable, neutral, resin-like substances, insoluble in water and soluble in organic solvents.

"This class of compounds is generally suitable for employment in cellulose acetate compositions as will later be described. However, on account of the high melting points and stability of the compounds containing the normal butyl group, we prefer to employ polyvalent metallic salts of butyl half esters of phthalic acid in our improved cellulose actetate compositions.

The Zinc Resins

"The zinc butyl resin is a friable transparent solid gum-like material which is so hard at room temperature that it may be pulverized like hard rosin. It softens with increased temperature and becomes liquid at about 150°C. It is soluble in all common organic solvents such as esters, alcohols, ketones and hydrocarbons. It is insoluble in water. The cadmium butyl resin is similar to the zinc.

"The lead butyl resin has properties similar to the zinc butyl resin, except that it is amber in color.

"The ferric butyl resin is a ruby-red material with properties similar to the zinc butyl compound and the copper resin is a brilliant azure-blue material of similar properties.

"We have now discovered that these alkyl metal resins are miscible with solutions of cellulose acetate in volatile solvents and that when the solvents are evaporated the residue of cellulose acetate and metal alkyl resin forms a clear homogeneous durable film. For

example, the ferric, cadmium, zinc, and copper alkyl resins may be dissolved in solutions of cellulose acetate in acetone, diacetone alcohol, tetrachlorethane, ethyl, propyl, or butyl lactate or in mixtures of these solvents, or in other volatile, organic, cellulose acetate solvents. When used in suitable proportions these alkyl metal resins are valuable modifying ingredients for cellulose acetate films and lacquers.

Uses

"To illustrate the use of these materials we may describe a cellulose acetate—resin lacquer as follows:

"16 ounces of acetone-soluble cellulose acetate is dissolved in two quarts of a solvent mixture composed of 80% of a low-boiling cellulose acetate solvent, for example acetone; and 20% of a higher-boiling solvent, such as diacetone alcohol, tetrachlorethane, or diacetone alcohol. 16 ounces of ferric alkyl resin or copper alkyl resin is dissolved in two quarts of an identical solvent mixture, and the two solutions are mixed to produce a lacquer.

"On brush, spray, or dip application this lacquer serves to form a tough adherent durable film. If desired, the zinc or cadmium alkyl resins may be substituted, in slightly smaller proportions than that employed in the cases cited above, or other metal alkyl resins may be employed.

"Frequently it is desirable to add a suitable non-volatile plasticizer to produce more elastic or extensible film. Suitable plastizers—such as dibutyl phthalate—may be employed in the solution in amounts up to 100% of the weight of the cellulose acetate. If desired a suitable pigment, dye, or lake may be incorporated in the lacquer.

"The above example, while it relates specifically to cellulose acetate lacquers, is descriptive rather than limiting. Metal alkyl resins are useful ingredients in cellulose acetate films

and cellulose acetate **plastic masses.** The same solvents used in cellulose acetate lacquer may be employed in producing films or plastics containing metal alkyl resins."

Plastics From Lobsters

(*Continued from page 104*)

weight of a neutral aqueous solution of either the chloride or nitrate of calcium at the boiling temperature (115° C.), when the fibroin, major constitutent of the silk, goes into solution in a few minutes.

Wool, consisting for the most part of fibrin and keratin, is more difficult to dissolve, and requires very concentrated solutions heated under pressure.

A point of interest is that casein will dissolve at 25°C. to form colloidal solutions when treated with lithium thiocyanate.

The complex plastic masses resulting from mixtures of these raw materials should be of great interest and would well repay investigation.

Pen Desk Sets

WORTHY of note has been the recent injection of style elements into fountain desk sets as advertised by an important department store in New York City. Emphasis was laid on the popularity and appropriateness of these adjuncts to the up-to-date writing table and stress laid on the variety of the available color combinations.

Short & Roehm

THE manufacture of pyroxylin plastic articles for advertising and commercial purposes will be the business of the Short and Roehm Company, 372 Orange Street, Newark, N. J., a new concern. Joseph B. Short, president, and Richard Roehm were formerly affiliated with another firm in the capacities of general sales manager and suprintendent of production, respectively.

Some Recent Trade Mark Applications

INDA. (non-inflammable). A new Product of Plastic Nature which is a derivative of Milk and known as Inda, and used in the manufacture of combs, mirrors, etc. (giving over one hundred uses). Serial No. 231652; filed May 15, 1926; claiming use since May 10, 1926. American Machine and Foundry Co.

AMBEROL. Synthetic or chemically prepared resins, especially if soluble in linseed oil and suitable for varnish purposes. Claim use since May 16, 1924. Rohm & Haas Co., Inc. Philadelphia.

PYRA. For Electrical Switch Plates. Srial 223430. Claims use since July 1, 1925. Harvey M. Brown, Philadelphia, Pa.

KODAK. For Lacquers. Claims use since Oct. 1, 1915. Eastman Kodak Co., Rochester, N. Y.

TRANSPERIT. Films of viscose, cellulose sheets obtained from viscose and other cellulose solutions. Claims use since Jan. 1, 1924. Wolff & Co., Walsrode, Germany.

STEELAC. For a lacquer. Claims use since Nov. 11, 1926. Ultralac Products Co., Washington, D. C.

BAKELITE. For agitators and covers for washing machine and rings for laundry collectors. Serial 237107. Claims use since Sept. 1, 1926. Bakelite Corp.

The official Gazette of the U. S. Patent Office of Jan. 25, 1927, p 727, has a notice of two trademark applications of the Parker Pen Co., of Janesville, Wis., for a trade-mark for fountain pens, the mark consisting of a green coloring for the pen body with

black end portions. The applications, Serial 238135, 238136 were filed Oct. 4, 1926, use being claimed since April 23 and April 15, 1915.

Another "Permanite"

It will be recalled that in the December issue, 1926 of **Plastics** the Parker Pen Co. was said to make use of a pyroxylin pen barrel, and that this company had named the material PERMANITE. Now the General Plate Co., of Attleboro, Mass., has also filed an application for a trade-mark for PERMANITE, claiming use since March 10, 1924. This one, however, is for nonferrous alloys. Under our present laws this is permissable as the products are dissimilar.

H-P-M Exhibits

A NOTEWORTHY exhibit at the recent Chicago Power Show was that of forged steel, hydraulic valves and fittings shown by the Hydraulic Press Mfg. Co., Columbus, Ohio.

The exhibit was in charge of Mr. Paul C. Pocock, General Sales Manager of the Company, and the general impression gathered was that business was brisk and prospects were good.

THE Waterbury Button and Manufacturing Company, Waterbury, Conn., are undertaking Bakelite molding, and, with this end in view, are installing a complete Bakelite molding plant.

Comb Prospects Better Say Some

THE unpromising outlook for the comb industry recently pictured in the New York Times, would not appear to be borne out by the actualities, to judge from the results of a canvass among manufacturers instituted by the Leominster Daily Enterprise.

Recent orders placed by large novelty buyers have been distinctly encouraging, so that this year's business should not fall below that done last year.

Durez

(*Continued from page 124*)

at North Tonawanda was particularly well planned, as this city is in the center of an abundant skilled labor market, an excellent shipping point, both east, west and south and into Canada, and near to a very low priced electric current supply. Furthermore several plants producing wood flour are located at North Tonawanda, and other raw material supplies are available without long expensive hauls. The impression upon the visitor to the plant is one of a marked cordiality and in other words of one of the officers of the organization, "We do not propose to lose this through becoming a larger organization but rather to improve old friendships, and to make new ones as time goes along."

Furfural Production Increasing

The supply of commercial furfural is continually on the increase due to the enlargement of the plant of the Quaker Oats Co., where this product is made from oat hulls.

The Miner Laboratories, of Chicago, Ill., are responsible for this development, and are handling the entire output for the trade. Inquiries will receive courteous attention.

Synthetic Camphor in Favor

THAT synthetic camphor is replacing the natural product for domestic manufactures is clearly indicated by the following import figures issued by the Bureau of Foreign and Domestic Commerce:

	1925 pounds	1926 pounds
Crude	2,369,413	1,990,953
Refined	1,583,902	1,121,529
Synthetic	1,834,988	2,824,867

In 1921, out of total imports of 1,914,778 lbs., the synthetic commodity accounted for only 6%. Whereas Japan is the source of 95% of the natural product, practically the entire import of the synthetic product emanates from Germany.

How, When and Why?

The following question and its answer are taken from our esteemed French contemporary, the Revue Generale des Matieres Plastiques.

Question—Articles made of casein solid are rather brittle, a very serious disadvantage, and one of the chief reasons why materials of the galalith class have not yet been put to all their possible applications. Is there a remedy or remedies for this? I am putting the inquiry through the medium of your columns as I am sure that it is of great interest.

Reply—We have forwarded this inquiry to one of our collaborators. Here is the reply:

I make no claim to solve your problem in an absolute manner. I may say, however, that in the course of my own experiments on the manufacture of casein materials 50% neutral sodium ricinosulfonate seemed to render the galalith much more resistant. I used 3 parts of ricinosulfonate to 100 parts of casein. I found also that the product was more transparent.

Wood, Stone and Concrete Impregnated with Phenol Resins

The induration of porous objects, such as stone, concrete, wood, plaster or paper with natural resins and a reactive mixture of phenol and aldehydes capable of condensing upon being heated is the subject matter of a patent granted on Jan. 11, 1927 to John J. Kessler, of St. Louis, Mo.

The present process differs from all preceding methods in that the phenol and aldehydes are not preliminarily condensed, but are added in their natural state. The presence of a resin, such as manila gum serves to hold the phenol and aldehyde in the composition until the condensation can be effected by subsequent heating.

The inventer states that he

(*Continued on page 140*)

Materials
for the Plastics Industries

Impregnating

(*Continued from page 138*)

has found that if the phenol is first fluxed with a natural resin such as common rosin, Manila copal, gum shellac, or the like, that these substances will serve to act as a vehicle to retain the phenol. The mixture of resin and phenol has many of the mechanical properties of a partially polymerized synthetic resin, such as adhesive properties.

A specific example employs 30 parts of Manila gum, 70 parts of phenol or cresol, and 10 parts of hexamethylenetetramine. Such a mixture can be kept fluid at temperatures sufficiently low so that polymerization does not quickly take place and porpous objects may be impregnated with it by immersing the object in the mixture.

After impregnation the object is heated to from 120 to 200 degrees C. to effect the reaction and to harden the resin that forms. The natural resin also appears to take part in the reaction.

AN electric heater was the cause of a blaze, Feb. 24, in the pyroxylin plastic novelty concern of Mark Ginsberg & Co., on the ninth floor of the twelve-story loft building at Sixth Avenue and Fourth Street, New York City. One result of the flare, which was soon under control, however was the rather hurried evacuation of the structure by the 500 people employed therein.

Phonograph Exports Gain

Last year foreign sales of American phonograph records reached a total of 5,538,000 units, valued at $2,222,000, as compared with 4,091,000, valued at $1,720,000 in 1925.

BUYERS' GUIDE

ABRASIVES
Nulite Polish Co.

ACCUMULATORS
The Burroughs Co.
The Dunning & Boschert Press Co. Inc.
Hydraulic Press Mfg. Co.
The Adamson Machine Co.
Chas. F. Elmes Engineering Works
French Oil Machinery Co.
R. D. Wood
A. B. Farquar

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Aladdinite Co.

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CASEIN
T. M. Duche

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CELLULOID SCRAP
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Leominster Tool Co.
J. J. Krehbiel

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